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*A Third Contribution to a Knowledge of the Influence of Employments upon Health.* By WILLIAM AUGUSTUS GUY, M.B. Cantab., Professor of Forensic Medicine, King's College, and Physician to King's College Hospital, Hon. Sec., &c.

[*Read before the Statistical Society of London, May 20th, 1844.*]

IN the last two numbers of the Journal of the Statistical Society, the influence of employments upon health was illustrated by means of probabilities confessedly open to objection, and still standing in need of confirmation. The ratio of cases of pulmonary consumption to those of all other diseases occurring among the out-patients of a public hospital (the first test employed) was obviously insufficient, inasmuch as that ratio will depend upon the comparative frequency of many diseases of a trivial nature, which may vary with the several employments. This being the case, it has seemed advisable to confirm the probability derived from this source by another probability open to a different class of objections. Such is the ratio of cases of death by consumption to those due to all other causes, as gleaned from the sanitary registers for the year 1839; which registers have been already employed in the latter part of the author's last communication to the Society.

These registers, as has been already stated, are open to the objection that the causes of death are often imperfectly registered. Without intending to lessen the force of this objection, as applying to the greater number of diseases, there is reason to believe that the cases registered as death by consumption, pulmonary consumption, decline, phthisis, &c., above the age of 15, form nearer approximations to the actual facts than almost any other class of diseases, and that, for purposes of comparison, they may be used with some degree of confidence.

The first object of the present Essay is to ascertain whether, and to what extent, the ratio which cases entered under these titles bear to all other diseases, corresponds with the ratio already obtained from the books of the King's College Hospital; for if a close correspondence shall be discovered, it will add great strength to the probability already deduced from the last-named source. Another object is to illustrate a question of considerable interest and importance, for which the hospital registers did not furnish the requisite materials, viz.: whether the several classes of society, the gentry, tradesmen, and working men, are equally liable to attacks of pulmonary consumption? The answer to this question will lead to a consideration of the causes of the unequal prevalence of the disease among the three classes; and this will suggest a further inquiry as to the actual amount of pulmonary consumption in this country; and will originate an attempt to determine the actual waste of human life due to this cause.

It is proposed in this communication to follow as closely as possible the order observed in the Essays already laid before the Society.

The following table shows, for in-door and out-door employments, the per centage proportion of deaths from pulmonary consumption at different ages, and under 30 and 40 years respectively, the ratio which such cases bear to the deaths from all other causes, and the total number of cases on which the calculations are founded:—

TABLE I.

Nature of Occupation.	15 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Under 30	Under 40	Ratio of Deaths from Con- sumption to those from all other diseases.	No. of Deaths.	
											Con- sumption	Other Diseases.
In-door . . . .	9·14	25·88	24·78	21·22	12·55	5·81	0·62	35·02	59·80	1 to 2·08	1291	2687
Out-door . . .	4·87	20·93	28·04	24·73	14·31	6·82	0·29	25·80	53·84	1 to 2·56	1027	2621

The following table contrasts the same classes of employment after all exceptional occupations have been excluded :—

TABLE II.

Nature of Occupation.	15 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Under 30	Under 40	Ratio.	No. of Deaths.	
											Con- sumption	Other Diseases.
In-door . . . .	9·57	27·96	23·98	20·32	11·40	6·13	0·64	37·53	61·51	1 to 1·98	930	1844
Out-door . . .	4·79	20·00	28·65	24·48	14·69	7·08	0·31	24·79	53·44	1 to 2·56	960	2453

The correspondence between these two tables and Tables IV., V., XIII., and XV. of the first essay is even greater than might have been anticipated. The ratio obtained from the hospital books, and those derived from the mortuary registers, agree in displaying the greater liability to attacks of consumption of persons employed within-doors. On comparing Table V. of the former essay, with Table II. of the present, it will be seen that the ratios are, for in-door occupations, 1 to 3·81 and 1 to 1·98 respectively; and for out-door occupations, 1 to 4·13 and 1 to 2·56 respectively. In Table IV. of the first essay, which contrasts in-door and out-door employments previous to the elimination of certain exceptional occupations, the ratios were the same for the two classes of employment, while in Table I. of the present essay the ratios are 1 to 2·08 and 1 to 2·56. The deaths, then, present a stronger contrast between in-door and out-door employments than the facts extracted from the hospital books; but the two classes of facts strongly confirm each other.

There is also an entire agreement between Tables XIII. and XV. of the former essay and Tables I. and II. of the present, in respect of the distribution of the cases and deaths from consumption according to age. The cases of consumption registered in the hospital books, as occurring under 40 years of age, in men following in-door and out-door employments respectively, were in round numbers 81 and 63 (Table XIII.), or 83 and 62 (Table XV.); and in the present essay the numbers are 60 and 54 (Table I.), or 61 and 53 (Table II.). So that here also the two classes of employment occupy the same relative place, and indicate the same comparative liability to consumption, whether the hospital books or the mortuary registers are used as the mean of comparison. Both agree in representing pulmonary consumption to be both more frequent, and of earlier occurrence, in men following in-door employments, than in those working in the open air.

The next inquiry entered into in the first essay, was the influence of different degrees of exertion in promoting pulmonary consumption, and

in hastening the period of its attack. This point was illustrated by Tables VI. and XVII. of that essay. The following table shows, for occupations requiring different degrees of exertion, the per centage proportion dying of pulmonary consumption at each period of life, and under 30 and 40 years of age, the ratio of deaths from that disease, and the number of facts upon which the table is founded :—

TABLE III.

Nature of Occupation.	15 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Under 30	Under 40	Ratio.	No. of Deaths.	
											Con- sumption	Other Diseases.
In-door :												
Requiring little exertion . . }	11·85	32·21	22·42	19·07	10·48	2·58	1·29	44·06	66·48	1 to 1·76	388	684
Requiring more exertion . . }	8·37	23·91	23·21	23·21	12·68	7·90	0·72	32·28	55·49	1 to 2·20	418	881
Requiring great exertion . . }	8·22	23·29	23·29	13·70	21·91	8·22	1·37	31·51	54·80	1 to 2·10	73	152
With varied exercise . . . }	6·01	25·56	30·08	16·54	9·02	10·53	2·25	31·57	61·65	1 to 2·27	133	302
Out-door :												
Requiring moderate exertion }	8·92	23·80	26·78	20·86	10·71	8·33	0·60	32·72	59·50	1 to 2·21	168	372
Requiring greater exertion . }	3·55	17·41	28·24	26·83	16·87	6·75	0·35	20·96	49·20	1 to 2·27	563	1279

In the case of in-door occupations, there is the same general agreement between the results of the foregoing table and those of the first essay, which has just been noticed in comparing in-door with out-door occupations.

The ratios obtained from the hospital books were, for the first three classes of employment, 1 to 3·08, 1 to 4·44, and 1 to 5·06; those deduced from the mortuary registers are, 1 to 1·76, 1 to 2·20, and 1 to 2·10. In both cases the sedentary class of occupations holds the same place, and presents the highest ratio; but employments requiring great exertion hold the second instead of the third place in the mortuary registers. The difference, however, which causes this change of place is so slight as scarcely to deserve attention, and may probably be explained by the small number of deaths entered under this head.

The age at which pulmonary consumption proves fatal in the three classes of in-door employment corresponds with the age of attack, as obtained from the hospital books. The numbers under 30 and 40 years of age respectively follow the same order as in Table XVII. of the first essay.

In the class of employments with varied exercise, the proportion of deaths from consumption under 40 years of age does not bear the same relation to the other classes as does the proportion of attacks of consumption. The proportion of deaths under 40 ranks next to that obtained for the sedentary class of occupations, while the proportion of attacks under 40 is higher than that which prevails among persons following sedentary occupations. Though the position of these two classes is different, the two together occupy the same place, in respect of the other two classes of in-door occupation. It will be observed, that the proportion of deaths under 30 does not preserve the same relative position as the proportion under 40 years of age.

On referring to the employments carried on in the open air, it will be seen that the ratio of deaths is somewhat higher in the class requiring moderate exertion, while the ratio of attacks of the disease is higher in the class requiring greater exertion. The per centage proportion of deaths, however, occurring under 30 and 40 correspond with the ratio of attacks as displayed in Table XVII. of the first essay. There is a great excess of both in those employments requiring the lesser degree of exertion. It follows, then, that the correspondence between the results of the foregoing table and those of the first essay, though not exact, is very considerable; and in the case of employments carried on within doors, it is so close as to give strong confirmation to the general principle laid down in the two former essays, that the tendency to consumption varies inversely as the amount of exertion.

It would have been interesting to extend the comparisons already instituted, to the effect of intemperance, of exposure to dust, &c., in promoting pulmonary consumption, and in hastening the period of its attack; but the small number of facts, and the necessary imperfection of the registers themselves, would render such a comparison of little use.

One comparison still remains to be made, which has no parallel in the first communication addressed to the Society, viz.: that of the deaths from pulmonary consumption occurring among the three classes of gentlemen, tradesmen, and artisans. This comparison is made in the following table:—

TABLE IV.

Condition.	15 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Under 30	Under 40	Average Age at Death.	Ratio.	No. of Deaths.	
												Con- sumption	Other Diseases.
Gentlemen, &c. . . .	10·84	18·67	27·11	19·27	15·06	6·03	3·01	29·51	56·62	39	1 to 5·00	166	835
Tradesmen	8·46	24·34	26·98	20·11	12·70	6·35	1·06	32·80	59·78	38	1 to 2·60	189	491
Artisans, &c	7·25	23·69	26·24	22·79	13·34	6·26	0·43	30·94	57·18	38½	1 to 2·29	2318	5308

This table corresponds very closely with Table XIX. of the second essay, in which a comparison was made between the deaths at the several ages in the three classes. The ratios of death from consumption follow the same order as the average age at death, being lowest where the average age is highest, and the reverse. Thus the average age at death of the class of gentlemen is 58·61, and the ratio of deaths from consumption is 1 to 5; in the case of the tradesmen, the average age is 48·84, and the ratio of deaths from consumption 1 to 2·60; while in the class of artisans, the average age is 48·06, and the proportion of deaths from consumption 1 to 2·29.

Again, the class of gentry presents a smaller proportional number of deaths under 30 and 40 than either of the other classes. It is also well worthy of observation, that the per centage proportion of deaths from consumption under 30 and 40 is higher in the class of tradesmen than in that of the artisan and labourer, although the ratio of cases of consumption is greater in the latter class. This is doubtless accounted for by the fact already established, that the strong exertion which a considerable proportion of the labouring class employed within doors use in

their occupations, and the large number employed out of doors, has the effect of retarding the attack of pulmonary consumption. A glance at the following table will convince us of the justice of this explanation.

TABLE V.

Nature of Occupation.	Under 30.	Under 40.
In-door, sedentary . .	44·06	66·48
In-door . . . . .	37·53	61·51
Tradesmen . . . . .	32·80	59·78
Out-door . . . . .	24·79	53·44
In-door, requiring great exertion . . . . .	31·51	54·80

The tradesman, it will be seen, occupies the intermediate place between the in-door and the out-door labourer, between the artisan using little exertion and the artisan using much exertion. It is obvious, therefore, that the class of artisans owes the slight advantage which it enjoys over the tradesmen in respect of the time of death from consumption, to the comparatively healthy effects of strong exertion within doors, and of employment in the open air, which falls to the lot of a part of that class. Another point attracts attention in Table IV., viz., the great proportion of deaths from consumption occurring in the class of gentry from 15 to 20 years of age. Does not this show that the liability to the disease is greater in this class than in the two others; and does it not tend to strengthen the position, that the excess of deaths from consumption in the other classes is due to the unfavourable circumstances in which they are placed?

The ratio of deaths from consumption in the class of gentry, low as it is, would have been still lower if the medical men who are included in it were omitted. The number of cases of pulmonary consumption occurring in members of that profession is very remarkable, and it is a subject of regret with the author that they were not made a separate class.

If we assume that the numbers and proportions in the table are fair representations of the absolute and relative mortality from consumption in the three classes of society in London, and that it is possible, by due attention to the health of our tradesmen and artisans, to place them in as favourable a position as that which the gentry occupy in this respect; if, in other words, the ratio of consumptive cases, instead of being 1 to 2·60 in the case of tradesmen, and 1 to 2·29 in the case of artisans, were in both cases 1 to 5, there would be a saving in the metropolis alone in a single year of no less than 1123 lives.

Again, if we assume the approximate average age at death from consumption in the three classes to be the true age, we must add to these lives, unnecessarily sacrificed, 1937 years of life wasted.

It should also be borne in mind that, taking one case with another, every death from consumption is preceded by two years of lingering illness; and that in a large proportion of cases the fatal attack of the disease is not the first, and that it is often the last of a series.

This rough estimate of the annual waste of life from consumption in the metropolis is formed from the deaths comprised in the tables, which

fall short of those actually occurring, inasmuch as all the deaths in work-houses, unless the employment happen to be stated, are omitted. In order to ascertain more nearly the actual number of deaths from this cause, and the probable waste of life, I propose to calculate the number of deaths occurring in the metropolis, and in England and Wales, from the data furnished by the report of the Registrar General.

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*Estimate of the number of cases of Pulmonary Consumption occurring annually in the Metropolis, and in England and Wales.*

It has already been stated that the number of cases entered in the mortuary registers as pulmonary consumption, or under synonymous titles, between the ages of 15 and 50, is probably a near approximation to the true number; for the number of other diseases, accompanied by slow decay, occurring between these two ages is comparatively small, and certainly bears a much less proportion to true cases of pulmonary consumption than those entered as such, either before 15 or after 60. On referring to the mortuary registers of the metropolis for 1840-41,\* it will be seen that no less than 3120 deaths from consumption are entered under 15, and as many as 747 after 60; while the number between 15 and 60 is 10'698; now it must be obvious that these are not deaths from *pulmonary* consumption; for the deaths from that disease, under 15 and above 60, do not bear any such proportion to the deaths from the same cause between 15 and 60. How then is this error to be corrected? and how is the true number of deaths from pulmonary consumption to be estimated? The easiest and simplest method is to start with the assumption that the cases entered as consumption, between 15 and 60, are cases of true *pulmonary* consumption, and then, having ascertained the proportion which the number of deaths from this disease, under 15 and above 50, bears to the number between 15 and 60, to calculate the number that ought to have been entered on the mortuary registers.

In the absence of any accurate tables of the relative number of cases of pulmonary consumption at these three periods† of life, I avail myself of the tables of deaths occurring in the London hospitals during 1840, and published in the Annual Report of the Registrar General for 1842, p. 292. These cases are correctly reported, and on the authority; in most instances, of an examination of the body after death. Before proceeding to make use of these data, it is necessary to premise, that it is not the absolute number of deaths from pulmonary consumption in the London hospitals, which it is proposed to make use of, but merely the relative numbers at different ages.

The number of deaths from pulmonary consumption, occurring in the London hospitals during the year 1840, was 412, which were thus distributed—

Under 15	. .	4
15 to 60	. .	396
60 and upwards		12

The number of deaths, then, occurring under 15 years of age is only one in 99 of those occurring between 15 and 60, while the number of

\* Fourth Annual Report of the Registrar General, 1842, p. 330.

† The tables given by Sir James Clerk, in his work on Consumption, do not comprise the first period under 15.

those occurring after 60 is one in 33. Assuming for the present that these are the real proportions, it will be easy to calculate the deaths occurring in the metropolis, and in England and Wales.

The deaths from consumption, between 15 and 60, registered in the metropolis, during the two years 1840 and 1841, were 10,688, or, for one year, 5344; the total number, therefore, according to the above suppositions, will be—

From 15 to 60	. 5344
Under 15 . . .	54
Above 60 . . .	162

Total for the metropolis during one year . 5560

This is about one-eighth of the deaths at all ages, and somewhat less than one-fourth of the deaths of all above 15 years of age.

Now the deaths in the metropolis from all causes, during 1841-42, were 90,556, or, for one year, 45,278; and assuming that the mortality from pulmonary consumption, in England and Wales, bears the same proportion to the total mortality, as it does in the metropolis, we have the proportions—

$$5560 : 45,278 :: 42,223 : 343,847$$

—343,847 being the number of deaths from all causes in England and Wales during 1841. This number falls short of the number entered in the mortuary registers, under the general title of consumption, by 17,369 deaths.

This calculation assumes that the relative mortality for the whole kingdom, from pulmonary consumption, is that of the metropolis; an assumption obviously incorrect, and greatly exaggerating the actual mortality from that cause. In order to arrive at a truer estimate of the mortality, it may be fairly assumed that the mortality from pulmonary consumption, for England and Wales, bears the same relation to the mortality of the metropolis, as does the mortality from all causes. This will give the following proportions,—

$$42,223 : 35,966 :: 2.605 : 2.219$$

The number of deaths from pulmonary consumption, occurring every year in England and Wales, may therefore be stated, in round numbers, at about 36,000, being rather less than one-ninth of the mortality from all causes at all ages, and 1 in less than 6 of the total deaths occurring above 15 years of age.

It must be understood that this estimate is put forth merely as a rough approximation, and not as a precise calculation. The materials for a more just estimate are still wanting.

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Having thus obtained a rough approximation to the number of deaths from pulmonary consumption, occurring in the metropolis and in England and Wales respectively, I resume the consideration of the waste of life due to this cause. The 5560 deaths include males and females, and the first step in the inquiry is to ascertain how many of them belong to each sex. For this purpose, I avail myself of the Hospital Reports for 1840, in which the sex, age, and cause of death are registered, and I find that in 100 deaths from all causes, there are in males 19 deaths from



consumption, and in females 15; and as there is no obvious cause of this disparity, except the relative frequency of the disease in the two sexes, I assume this to be the true ratio. From this ratio it is easy to calculate the number of deaths from consumption occurring in the two sexes; they are in males 3107 and in females 2453. The number of deaths from pulmonary consumption, comprised in the foregoing tables, as occurring in males of all ranks during the year 1839, is 2673; a number falling short of the above estimate by 434, which probably represents the deaths from pulmonary consumption occurring in workhouses in 1839 in men whose employments were not mentioned. The total deaths of adult paupers during that year was 3062, and if we assume that the deaths were equally divided between the two sexes, we shall have 1531 deaths occurring in males; and, on the supposition that the deaths from consumption formed one fourth of the total deaths, 383 deaths from that disease. Now 383 added to 2673 gives 3056 instead of 3107, the number according to the foregoing estimate. The slight difference still existing may probably be accounted for by the excess of deaths of men whose employments were not stated over men dying in workhouses whose previous employments were stated. This latter class was a very large one.

The estimated number of 3107 deaths may probably be regarded as a very close approximation to the number of males of all ages and classes dying of pulmonary consumption every year in the metropolis; and if the distribution according to rank be assumed to be that of Table IV, we shall have the 3107 deaths from consumption divided as follows:—gentry and professional men 193; tradesmen 219; and artisans, &c. 2695; the deaths from all other diseases for the three classes being 971, 569, and 6171. Now if the deaths from pulmonary consumption in the classes of tradesmen and artisans, bore the same proportion to all other causes of death as they do in the class of gentry, we should have, in the place of 3107 deaths from that disease, only 1541, being a saving of 1566 lives, and, on the supposition that the average age of death is that of Table IV, of 2014 years of life; moreover, for each of the 1566 lives prematurely sacrificed, we must reckon at the very least 3132 years of lingering illness during the very prime of life. If the same calculation corrected by the fraction  $\frac{1}{3}$ , which represents their relative liability to consumption, were applied to the deaths of females, it would raise the estimated annual waste of life to 2212, with an additional loss of 2845 years of life.

In all these calculations it is assumed to be possible, to place the classes of tradesmen and artisans in the same favourable circumstances as the gentry. Can this be done? It would be a great stretch of imagination to suppose that it could be done at once. In all great ameliorations time is an essential element—time for the reformation of bad habits—time for the widening of streets, the enlarging of houses, the re-constructing of workshops, the shortening of hours of labour, for drainage and ventilation, for the more abundant supply of water, for public baths, for the increase of open spaces for exercise and recreation. Habits of intemperance will not suddenly grow into disuse, nor will a desire for pure air be created in a day. As in the case of temperance, so in that of ventilation, the example must be set by the higher classes, before the contagion can be expected to spread to the lower. So long as the rich

shall be content to endure the stifling atmosphere of crowded places of assembly, whether public or private, and to sleep in rooms from which fresh air is sedulously excluded, the poor may be expected to remain indifferent to the foul air of their workshops, and to submit without a murmur to the manifold inconveniences of their places of residence. It is only, then, after the lapse of years that the condition of the tradesman and artisan can be expected to be so improved as to reduce their present fearful mortality from consumption to the low level of the more forward classes. Much, however, may be done at once. Some provision at least may be made for the ventilation of houses and workshops, and for the shortening of hours of labour. Such a provision would save, in the metropolis alone, many hundreds of lives every year. This is not a matter of conjecture, or a loose estimate merely, but admits of demonstration.

It has already been shown (Table II.) that the ratio which deaths by consumption bear to those from all other diseases, is higher in the case of men employed within-doors than in those working in the open air, being in the one case 1 to 1·98, and in the other 1 to 2·56. Now it is well known that, as a general rule, men employed in-doors earn higher wages than those who work out of doors, and that therefore they have the means of procuring better lodgings, clothing, and food. In all these things they have the advantage. They differ in this, that the in-door labourer, while he shares, though in a less degree, the household inconveniences of the out-door labourer, is confined for many hours of each day in heated and ill-ventilated apartments. A large proportion of men so occupied have as much exercise as men employed in the open air; the occupations of the remainder are of a more or less sedentary nature. Those whose employments require more or less exertion, differ from out-door labourers only in the air they breathe; and those who lead a sedentary life, partly in this, and partly in the absence of exercise. The experience of the wealthier classes addicted to sedentary pursuits, shows that such pursuits are not unfavourable to health and longevity. Hence there is good reason to believe that the in-door labourer owes his ill-health, not so much to the sedentary nature of his employment, as to the foul and heated air which he is constrained to breathe. If this reasoning be valid, it will be easy to show what number of deaths occurring among the in-door labourers might be prevented. A simple calculation, based on Table II., shows that the excess of deaths from consumption in the 2774 in-door labourers over the deaths from the same disease in an equal number of out-door labourers, is 150. Out of 930 deaths from consumption, therefore, no less than 150, or about one-sixth, may fairly be assumed to fall victims to the foul air of the workshop. If the entire estimated number of deaths from pulmonary consumption occurring among artisans, be divided between the two classes of in-door and out-door labourers, we shall have the number raised to 214; and the addition of lives prematurely sacrificed, and females, would swell this number to 400 a-year.

The estimates which have been thus formed of the waste of life in the metropolis, will have to be more than doubled to give the waste for the whole of England and Wales. A simple calculation founded on the number of deaths from consumption taking place in 25 town districts,\*

\* Registrar-General's Report, for 1843, p. 199.

on the supposition that the waste is in the same proportion in those districts as in the metropolis, gives us as the number thus sacrificed 4882, of which number 1000 deaths seem to be fairly traceable to the unwholesome condition of workshops and factories, and the remainder to the state of their dwellings, added to habits of intemperance, and the privations to which they are occasionally exposed.

What part of this waste is to be attributed to causes over which the poor have virtually no control, and what part to their own habits of life, it is of course impossible to state; but after making a liberal allowance for the effects of intemperance, and the occasional use of scanty or unwholesome food, there can be no room to doubt that a fearful waste of human life at present takes place, and that much of this may be prevented by the improvement of dwellings and workshops. Such improvement would doubtless bring with it, as a necessary consequence, a great improvement in the habits of the labouring class; for it has been clearly proved, and is, in fact, a necessary consequence, that all causes of exhaustion are indirectly causes of intemperance. Some experience of the poor, and inquiries expressly directed to this point, have convinced me that they are led into this baneful habit not so much by a love of intemperance and of its treacherous pleasures, as by the opinion that spirituous liquors are necessary to the support of their strength. Those who use strong exertion in their employments drink because they think that without spirituous liquors they could not do their work; but those who lead sedentary employments are often compelled to drink that they may neutralize the debilitating effect of an atmosphere which in extreme cases may be, with little exaggeration, described as combining the temperature of an oven with the foul air of a sewer. If they had pure air, they would soon cease to regard spirituous liquors as necessary to their existence, and the habits which grew out of a supposed necessity, might be fairly left to the correcting influence of experience and example. If those evils were once corrected over which the labouring class have no control, they would not be slow to perfect the work of a wise and far-seeing legislation.

Hitherto the attention of the public has been directed chiefly to the waste of human life, and the consequent misery and expense caused by fevers due to the bad drainage of towns and streets, and the defective construction of the houses of the poor; but those who have so successfully laboured to rouse the public to a sense of these fearful evils, and of the responsibilities growing out of them, have been ignorant of, or have disregarded the more silent and stealthy ravages of a disease which is as surely the result of foul air, overcrowding, and confinement, as fever itself of deficient drainage and unwholesome habitations. If the condition of the dwellings of our poorer classes is justly chargeable with the fevers to which they are constantly falling victims, to the state of our workshops and our long hours of work is as certainly to be attributed a large proportion of the cases of consumption which form so fearful an item in our mortuary registers. If the entire population of this country could be surrounded by influences as wholesome as those to which the higher classes owe their better health, longer life, and comparative immunity from consumption, the number of cases of pulmonary consumption would be greatly reduced, and some thousands of the most valuable part of our population might be saved. This rough estimate may be

TABLE VI.

Nature of Occupations.	Ratio of Cases of Pulmonary Consumption entered on the Hospital Books.	Ratio of Deaths from Consumption to those from all other Diseases.	Per Centage proportion of cases entered as Consumption.		Per Centage proportion of Deaths from Consumption.		Per Centage proportion of Deaths.				Age at Death.		Per Centage proportion Employed.						
			Under 30.	Under 40.	Under 30.	Under 40.	Under 30.	Under 40.	Under 40.	Above 40.	Above 80.	Above 90.	Ave- rage.	Great- est.	Under 40.	Above 40.	Above 50.	Above 60.	Above 70.
In-door . . . . .	1 to 3.81	1 to 1.98	50.98	83.21	37.53	61.51	21.88	38.82	2.74	0.22	47½	98	73.98	26.02	13.60	5.62			1.67
Out-door . . . . .	1 to 4.13	1 to 2.56	36.30	62.30	24.79	53.44	16.68	34.26	3.99	0.59	49½	99	63.83	36.17	17.95	7.04			1.15
In-door :—																			
Requiring little exertion . . .	1 to 3.08	1 to 1.76	51.03	81.37	44.06	66.48	24.34	40.29	2.71	0.19	46.86	98	74.88	25.12	13.65	6.31			2.06
Requiring more exertion . . .	1 to 4.44	1 to 2.20	53.41	80.81	32.28	55.49	19.17	36.72	2.77	0.39	48.06	101	72.15	27.85	14.64	5.77			1.75
Requiring great exertion . . .	1 to 5.06	1 to 2.10	48.63	67.55	31.51	54.80	17.81	33.81	1.33	..	47.75	90	68.96	31.04	15.05	3.14			0.94
With varied exercise . . . . .	1 to 3.32	1 to 2.27	47.28	87.27	31.57	61.65	24.59	41.83	2.53	..	45.68	90	75.64	24.36	12.95	4.31			1.61
Out-door :—																			
Requiring moderate exertion .	1 to 4.65	1 to 2.21	32.76	53.46	32.72	59.50	18.52	38.52	3.16	0.56	47.70	99	68.26	31.74	14.83	5.86			0.84
Requiring greater exertion . .	1 to 4.02	1 to 2.27	33.81	61.28	20.96	49.20	16.45	35.24	3.04	0.49	47.60	98	61.83	38.17	19.49	7.68			1.21

TABLE VII.

Condition.	Per Centage proportion of Deaths.				Average Age.	Greatest Age.	Ratio of Deaths from Consumption.	Per Centage proportion of Deaths from Consumption.	
				Under 30.				Under 40.	
	Under 30.	Under 40.	Above 80.						
Gentlemen, &c. . . . .	9.10	20.60	10.80	0.80	98	1 to 5.00	29.51	56.62	
Tradesmen . . . . .	16.03	32.50	3.39	0.59	97	1 to 2.60	32.80	59.78	
Artisans, &c. . . . .	19.86	37.51	2.48	0.34	101	1 to 2.29	30.94	57.18	

very far from the truth ; but it is better to err in this way than, by confining ourselves to the establishment of dry abstract principles, however interesting or important, to let pass an opportunity of forcibly drawing the attention of the public to a great evil, equally commanding and admitting of a remedy.

In all investigations of this nature there is much room for error. Some standards of comparison essential to accuracy are at present wanting. Causes and effects are so mixed up that it is impossible to separate them. The disease which by destroying the adult puts a younger man into his place, also alters the distribution of the population, so as to swell the number of its own victims ; and thus all attempts at perfect accuracy are rendered abortive. Approximations confessedly imperfect, and estimates necessarily rude, must hold the place of those accurate results which force conviction. The author would therefore again guard against misconception. He has not dared to characterise his results as certain or accurate, but merely as approximations to truth, and probabilities more or less strongly confirming one another. His estimates are open to correction, and await that correction at the hands of himself or others ; but he trusts that, in the absence of that certainty of which he is in search, the probabilities he has established will serve the purpose of attracting attention to a part of the great subject of public health which has hitherto received comparatively little attention ; and, in conclusion, he may be allowed to express his own conviction, that the evils which have been pointed out are not exaggerated.

Two tables are subjoined, which form a useful summary of the chief probabilities thrown together in the three communications, of which this is the last.

*On the Progress of the Population of Russia.* By MAJOR GRAHAM,  
Registrar-General.

SIR,

*General Register Office, June, 1844.*

I ENCLOSE an abstract of a Return which I have recently received of the population, marriages, births, and deaths, in the principal provinces of the Russian empire. I am indebted to the liberality of Count Nesselrode for this Return ; which was procured at the instance of Lord Aberdeen, by Lord Stuart de Rothsay, and forwarded to me by Sir James Graham.

I have obtained from other countries similar Returns, to compare with those made under the Registration Act in England. I submit this to the Members of the Statistical Society, as I believe that no Return of the kind has been published before out of Russia ; and it appears to me to possess an unusual degree of interest, not only from its novelty, but from the extent of the population, and the varieties of climate and circumstances in which the people of the several provinces are placed.

The Return is for the year 1842, and the abstracts of marriages, births, and deaths, had not been received from Georgia, Koursk, the Trans-Caucasian, or the Caspian provinces : neither have we included in the Return Finland, Poland, the Don Cossacks, the Cossacks in the country of the Black Sea, and of the Oural ; the provinces of Iakotsk, Kamschatka, Okhotsk, or Russian America. The population of the Russian empire exceeds 60,000,000 ; of which the Returns from 53